

SUPPORT FOR THE AMENDMENT

This Amendment amends the specification; and amends Claim 5. Support for the amendments is found in the specification and claims as originally filed. In particular, support for the amendment to the specification is found in the specification at least at page 44, lines 4 and 14. Support for Claim 5 is found in the specification at least at page 5, line 18. No new matter will be introduced by entry of these amendments.

Upon entry of these amendments, Claims 5-13 and 22 will be pending in this application. Claim 5 is independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the courtesies extended to their representative during the July 29, 2003, personal interview.

The present invention provides a recordable/erasable optical information recording medium that utilizes a difference in reflectivity resulting from a phase-change of an SbTe alloy recording layer upon irradiation with a laser. Because the SbTe alloy is amorphous as deposited, the recording layer must be crystallized ("initialized") before use by initially heating the recording layer. After the recording layer is initialized, bits are recorded by changing the crystalline SbTe alloy into the amorphous phase. Bits are erased by changing the recorded amorphous bits back into the crystalline SbTe alloy phase. The present invention solves initialization and stability problems in $\text{Sb}_{1-x}\text{Te}_x$ alloy recording layers by adding Zn to

Claims 5-13 and 22 are rejected under 35 U.S.C. § 102(e) over U.S. Patent No. 6,115,352 ("Ohno"). Ohno was filed on June 11, 1997. In contrast, Applicants are entitled to the priorities of four priority documents with filing dates ranging from October 4, 1996 to March 19, 1997. To perfect Applicants' claims to priority under 37 C.F.R. § 1.55, attached are an English-language translation and a statement that the translation is accurate for each of the four priority documents. Because Ohno is not prior art to the above-identified application, the rejection of Ohno should be withdrawn.

Claims 5-11 and 22 are rejected under 35 U.S.C. § 103(a) over JP 01-303643 ("Fujimori") in view of U.S. Patent No. 5,709,978 ("Hirotsune") (sic, see Interview Summary dated July 29, 2003). In addition, Claims 5-13 and 22 are rejected under 35 U.S.C. § 103(a) over Fujimori in view of Hirotsune and U.S. Patent No. 5,818,808 ("Takada"). Claims 5-13 and 22 are rejected under 35 U.S.C. § 103(a) over Fujimori in view of Hirotsune and Takada further in view of EP 0195532 ("Morimoto").

For the Examiner's convenience, an English-language translation of Fujimori is attached.

Fujimori claims a laser recording medium having an alloy film, in a recording layer, of a composition represented by the general formula $(\text{Sb}_{1-x}\text{Te}_x)_{1-y}\text{M}_y$ where $0.1 \leq x \leq 0.3$, $0 < y \leq 0.2$, and M is at least one element selected from the group consisting of Ag, Al, As, Au, Bi, Cu, Ga, Ge, In, Pb, Pd, Pt, Se, Si, Sn and Zn. Fujimori at Claim 1.

However, Fujimori exemplifies only ternary compounds of SbTeGe and ternary compounds of SbTeGe where "each of Ag, Al, As, Au, Bi, Cu, Ga, In, Pb, Pd, Pt, Se, Si, Sn and Zn was selected instead of Ge as the third element combined with the Sb and Te".

Any *prima facie* case of obviousness based on the cited prior art is rebutted by the significant improvement in initialization and stability achieved in accordance with the present invention using a recording layer having the composition $\text{Zn}_x\text{Ge}_y(\text{Sb}_x\text{Te}_{1-x})_{1-y-z}$, where $0.65 \leq x \leq 0.85$; the range of Ge is set by $0.01 \leq y \leq 0.20$; and the range of Zn is set by $0.01 \leq z \leq 0.15$. Ge is particularly effective for improving the thermal stability of the amorphous state and for increasing the archival stability of recorded amorphous marks. When the amount of Ge exceeds 20 atomic%, the composition tends to undergo phase separation, and the composition is likely to change by repetitive overwriting. Specification at page 42, lines 3-11. Zn facilitates initialization of the amorphous recording layer. If Zn exceeds 15 atomic%, the stabilizing effect of Ge tends to be lost. Specification at page 42, lines 15-20.

The specification demonstrates the significant improvements in initialization and stability provided by Ge and Zn by means of comparative examples, as shown in the following table.

	Specification	Composition	Initial crystallization* ¹	Stability of recorded amorphous marks* ²
Comp. Ex. 7	pp. 77-78	Sb ₇₂ Te ₂₈	×	×
Ex. 14	p. 76	Ge ₁₀ Sb ₆₇ Te ₂₃ (= Ge ₁₀ (Sb ₇₄ Te ₂₆) ₉₀)	×	○
Add'l Comp. Ex. 1	*3)	(Sb _{0.7} Te _{0.3}) _{0.9} Zn _{0.1} (=Zn ₁₀ (Sb ₇₀ Te ₃₀) ₉₀)	○	×
Add'l Comp. Ex. 1	*3)	(Sb _{0.8} Te _{0.2}) _{0.9} Zn _{0.1} (=Zn ₁₀ (Sb ₈₀ Te ₂₀) ₉₀)	○	- *4
Ex. 9	p. 70	Zn ₆ Ge ₇ Sb ₆₂ Te ₂₅ (= Zn ₆ Ge ₇ (Sb ₇₁ Te ₂₉) ₈₇)	○	○

*1) ×: Initialization required multiple exposures with a DC laser beam.

○: Initial crystallization was carried out in one scanning operation.

*2) ×: After the disk was left for 500 hours (or for 100 hours as in Additional Comparative Example 1) in an environment in which temperature was 80°C and the relative humidity was 80%, the recorded signals were deteriorated and were impossible to read out.

○: Even after the disk was left for 500 hours (or 2000 hours as in Example 14), the recorded signals showed no deterioration and could be read out sufficiently.

*3) For the details of the experiment, please refer to the attached Declaration Under 37 CFR 1.132.

*4) Even if the recording conditions were changed, it was impossible to form amorphous marks (for details, see the attached Declaration Under 37 CFR 1.132).

From the data, it is evident that:

(1) addition of Ge to the Sb₇₀Te₃₀ binary eutectic composition increases the archival

(2) addition of Zn to the $\text{Sb}_{70}\text{Te}_{30}$ binary eutectic composition facilitates initialization (initial crystallization); and

(3) simultaneous addition of Ge and Zn to the $\text{Sb}_{70}\text{Te}_{30}$ binary eutectic composition not only facilitates initialization (initial crystallization) but also increases the archival stability of recorded amorphous.

The cited prior art fails to suggest the improved initialization and stability of recorded marks achieved by the present invention over the recited ranges of Ge and Zn. Thus, any *prima facie* case of obviousness is rebutted. Therefore, the various rejections under 35 U.S.C. § 103(a) should be withdrawn.

Claims 5-13 and 22 are rejected under the judicially created doctrine of obviousness-double patenting over Claims 1-24 of Ohno. To obviate the rejection, a Terminal Disclaimer is attached.

Claims 5-13 and 22 are rejected under 35 U.S.C. § 112, second paragraph. To obviate the rejection, in Claim 5 " $0.01 \leq x \leq 0.15$ " is replaced with " $-0.01 \leq z \leq 0.15$ ".

Claims 5-13 and 22 are rejected under 35 U.S.C. § 112, first paragraph. To obviate the rejection, in Claim 5, both occurrences of "SbTe eutectic composition" are replaced with " $\text{Sb}_{70}\text{Te}_{30}$ eutectic composition".

In view of the foregoing amendment and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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Attachments:

English-language translation of JP 8-264357 and translator's statement
English-language translation of JP 8-264358 and translator's statement
English-language translation of JP 9-057496 and translator's statement
English-language translation of JP 9-066196 and translator's statement
English-language translation of JP 01-303643 ("Fujimori") and translator's statement
Declaration Under 37 CFR 1.132 (unexecuted, executed copy to follow)
Terminal Disclaimer over U.S. Patent No. 6,115,352



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